IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application No.	:	09/975,257
Applicant	:	SUNDAR NARAYANAN, ET AL.
Filed	:	OCTOBER 12, 2001
Title	:	NOVEL SELF MONITORING PROCESS FOR ULTRA THIN GATE OXIDATION
Confirmation No.	:	8852
Art Unit	:	2813
Examiner	:	HEATHER DOTY
Atty Docket No.	:	CYPR-0013-UT1

Mail Stop Appeal Briefs - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

APPEALLANT'S REPLY BRIEF

Sir:

This is in response to the Examiner's Answer mailed June 28, 2007. In replying herein, Appellants expressly carry forward the arguments advanced in their Brief on Appeal, and incorporate them herein. For the sake of brevity, they are not repeated. Rather, this Reply focuses on arguments advanced in the Examiner's Answer that are respectfully submitted to be inconsistent with the record, or inconsistent with the law.

REJECTIONS UNDER 35 U.S.C. § 103(A)

Claims 1, 3, 5-12, 17 and 18 stand rejected under 35 U.S.C. § 103(a) as purportedly being unpatentable over Japanese Application No. 2000-311928 (**Yasushi**) in view of United States Patent No. 6,372,581 (**Bensahel et al.**). The Examiner relies on 1) a perception that **Bensahel et al.** teaches that one can substitute NO for N_2O in the process of **Yasushi**, 2) that the reoxidation method of **Yasushi** will inherently distance the nitrided gate oxide layer from the substrate, and that 3) because the specific steps of Claims 8 and 11 are not shown in the application to be "critical" the absence of any teaching in the references relied on to suggest such a step is not fatal to the Examiner's rejection. See the Answer, pages 4, 5, 8 and 11. The Examiner is incorrect on the facts with respect to items 1 and 2 and mischaracterizes the law applicable to item 3.

It is the position of the Examiner that **Bensahel et al.** teaches one of skill in the art that the NO nitriding gas of **Bensahel et al.** can be used in the process of **Yasushi.** Respectfully, it teaches quite to the contrary. Initially, it is noted that the secondary reference clearly teaches that the resulting layers have different properties and does not allow localization of the nitride layer at the interface. Column 1, lines 37 – 45. Accordingly, it teaches that if one wishes to use NO to nitride the gate oxide, one must use a very specific, low temperature process. See Column 1, lines 55 – 65. Of particular importance is the fact that this process is inconsistent with the process of the principle reference, **Yasushi**. This principal reference requires a process of nitriding that employs temperatures of 900 degrees C, page 3 of the translation, the very

temperatures **Bensahel et al.** specifically teaches away from. Rather, **Bensahel et al.** calls for temperatures of nitriding "at a temperature at most equal to 700°C under a pressure of at most equal to 10^{4} Pa…" Column 1, lines 61 – 63. Note also that the primary reference, **Yasushi**, specifically teaches that altering parameters like pressure and temperature have a significant impact on properties. Second page of the translation. Thus, rather than teaching the interchangeability of NO for N_2O, Bensahel specifically teaches that substituting NO for N_2O in the process of **Yasushi** will change the desired properties.

This is reinforced by additional art of record, discussed at length in Appellants' Appeal Brief. **Gusev** specifically teaches that the nitrided layers arising from an NO nitriding of a gate oxide are electronically and physically different from one prepared using N_2O. See page 277. The Examiner concedes this is the case, Answer, page 18, then goes on to discuss **Gusev** ONLY in terms of whether nitriding using an NO layer would distance the nitrided layer form the interface. Respectfully, the Examiner misses the point. The process of **Yasushi** is similar to Applicants' in that it seeks to establish standardized conditions that will allow one to preserve electrical and physical properties of the nitrided gate oxide and measure nitrogen concentration. Translation, page 2. What the Examiner proposes to be an obvious substitution is one that cannot be used in the high temperature process of **Yasushi**, and will wind up with a nitrided layer of (unknown) but sharply different properties than that obtained by the **Yasushi** process. Respectfully, what the art establishes is that using both NO and N_2O was known in the art by the

time of Applicants' filing, and that it was also well known that it was NOT expedient to substitute one for the other. This is not the standard of the law. Quite simply, the use of NO requires process parameters different from those of **Yasushi**. The secondary reference, **Bensahel et al.** teaches away from the combination of art made by the Examiner, and away from the invention claimed.

This error is compounded in the current case by reliance on inherency, by the Examiner, to support a case of obviousness. Specifically, the Examiner theorizes that oxidizing the nitrided gate oxide layer prepared according to the teaching of **Yasushi** *but using the NO of* ***Bensahel et al.*** will inherently distance the nitrided gate oxide from the substrate, as required by the claims. The Examiner so concludes because an example of Applicant's specification shows distancing to occur. Respectfully, the Examiner cannot rely on Applicants specification t o support an obviousness rejection. This seems to be well established in the law. Moreover, as discussed above, **Bensahel et al.** does NOT teach oxidizing a nitrided gate oxide of the type prepared by Applicants, or by **Yasushi**. Again, note, **Bensahel** teaches that to be useful, the NO must be used at temperatures below 700°C. Applicants call for a different type (RTP) of nitriding. Moreover, oxidation according to the pending application occurs at 800 - 1025°C (page 9, line 19) where that of **Bensahel et al.** occurs at 700 - 850°C. There is no reason to expect the nitride layer of **Bensahel et al.** to migrate in the same fashion that of **Yasushi** migrates, or that of Applicants'. Where inherency is to be relied on, it is incumbent on the Examiner to demonstrate identity of

product and process, before a rejection is supported – it is not the burden of Applicants to disprove it without more.

Finally, in the context of the principal rejection, the Examiner acknowledges that the two references, taken together, do not teach the limitations of Claims 8 and 11, but that notwithstanding that silence, it is incumbent on Applicants to demonstrate their criticality. Respectfully, the law is to the contrary. Criticality is a burden on Applicants where the parameter recited is known to be result effective, but the range recited is different, and thus relied upon. *In re Waymouth*, 182 USPQ 290, 292 C(CPA 1974). Where the art does not even recognize the recitation in question as a valuable parameter to measure, unobviousness is made out. *In re Antonie*, 195 USPQ 6, 9 (CCPA 1977). In any event, the Examiner's position is not clearly understood. According to Claim 8, a change in the thickness of the oxidized nitrided gate oxide calls for determining the thickness prior to nitration. This is how the claim is practiced. One either does it that way, or practices a different invention. The same is true of the measurement approximation of Claim 11. These are not steps incidental to the practice of the invention.

As the rejection of Claims 1, 3, 5-12, 17 and 18 is premised both on a combination of references taught away from by the art, and an errant legal shifting of the burden of proof, reversal of these rejections is respectfully requested.

Claims 2 and 13-16 stand rejected under 35 U.S.C. § 103(a) as purportedly being unpatentable over **Yasushi** in view of **Bensahel et al.**, and further in view of *"Silicon Processing for the VLSI Era"*, Vol. 1-3 (**Wolf et al.**). The Examiner's rejection flies directly in the face of the teaching of the references, and must be reversed.

It is the position of the Examiner that **Wolf et al.** teaches the rapid thermal oxidation process of the claims as presented, and in isolation, the Examiner is correct. But **Bensahel et al.** *specifically teaches that the RTP process should not be used with nitrided gate oxide layers prepared from NO nitriding steps.* Note that the reference specifically refers to NO nitriding of gate oxide layers, and then gives specific reasons for not employing rapid thermal processing. Column 1, lines 37 – 45. Indeed, this is the point of alleged improvement of **Bensahel et al.** Column 1, lines 55 – 57. This is, quite simply, contrary to law, and the teaching of the art. Reversal of this rejection is respectfully requested.

The remaining rejections, of Claims 19 and 23, each rely on **Bensahel et al.** and **Yasushi** and **Wolf et al.** in the exact same fashion, but do not overcome the specific defect in the rejections, that the references teach away from the very combination made, for very specific reasons. Respectfully, Applicants submit that the rejections made herein were arrived at by selecting a related reference**, Yasushi**, which the Examiner concedes does not teach the claimed invention, and then pouring through relevant literature to find the bits and pieces of Applicants claims – *ignoring the specific teachings of the art against such combination of practices.* The

rejection of dependent claims is further buttressed by an improper shifting of the burden of proof, calling on Applicants to identify critical use of a limitation the Examiner admits is nowhere taught in the art.

Applicants acknowledge that the recent decision in *KSR v. Teleflex, Intl*, 82 USPQ2d 1385 (US 2007) is widely regarded as having eased the rigorous treatment obviousness rejections have been given in the past. That decision, however, goes to the question of teaching, suggestion or motivation. It nowhere condones rejections that fly in the face of the express teaching of the art.

Reversal of the rejections advanced in this matter is accordingly appropriate, and the same is respectfully requested. An Oral Hearing is requested contemporaneously with the submission of this Reply Brief, 37 CFR 41.47(b).

Respectfully submitted,

/Steven B. Kelber/
Steven B. Kelber
Reg. No. 30,073
Customer No. 22,506

JAGTIANI + GUTTAG
Democracy Square Business Center
10363-A Democracy Lane, Fairfax, Virginia 22030
(703) 563-2011 (direct)
(703) 591-2664 (main)
(703) 591-5907 (fax)
August 28, 2007